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THE OSTEOLOGICAL SERIES FROM CABEÇO DA AMOREIRA (MUGE, PORTUGAL)

LA SÉRIE OSTÉOLOGIQUE DE CABEÇO DA AMOREIRA (MUGE, PORTUGAL)

E. CUNHA [1], F. CARDOSO [1]

ABSTRACT

In the present paper we present the first anthropological results for one of the most classic European Mesolithic sites, the Cabeço da Amoreira, hereafter Amoreira, on the Muge tributary of the Tagus River in central Portugal. Apart from this one, there are three more shell middens on the Tagus river: Moita do Sebastião, Cabeço da Arruda and the lesser known, Cova da Onça. While human remains from Moita and Arruda are well known, the osteological material from Amoreira was never analised. Thus the anthropological data presented here —a set of 21 individuals this far unpublished— make an important contribution to our understanding of the Mesolithic people who inhabited the Iberia Peninsula.

Keywords: Muge, Mesolithic, skeletal remains.

RÉSUMÉ

Cette contribution présente les premiers résultats de l'étude anthropologique de l'un des sites les plus classiques du Mésolithique européen, Cabeço da Amoreira, qui se trouve au centre du Portugal, sur un affluent du Tage, la Muge. Il existe 3 autres amas coquillers sur le Tage : ceux de Moita do Sebastião et de Cabeço da Arruda et celui, moins connu, da Cova de Onça. Les restes humains de Moita et Arruda sont bien connus mais ceux d'Amoreira n'avaient jamais été étudiés. Les résultats présentés ici concernent 21 individus ; ils constituent une contribution importante à la connaissance des populations mésolithiques de la péninsule Ibérique.

Mots-clés : *Mésolithique, Muge, restes humains.*

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INTRODUCTION

The great number of skeletal remains recovered put the Muge sites among the most famous Mesolithic sites in the world. In effect, around at least two hundred skeletons are known from Muge. This valuable series, however, came from only two of the three main shell middens of Muge. Since the first discovery in 1863, three main sites were brought to light: Cabeço da Arruda, Moita do Sebastião and Cabeça da Amoreira. Cova da Onça is the fourth, more distant and less known midden. While the first two were subject to a number of anthropological research and publications (Roche, 1967 ; Jackes, 1988 ; Jackes and Lubell, 1999, among others), the osteological material recovered at Amoreira was never researched and/or published. Even though the lithics (Roche, 1951 ; Rolão, 2001) and the faunal remains (Lentacker, 1986) were published, although this latter only in a preliminary report, the human remains were never analysed before, remaining unpublished. The reasons for this lack can be found both in the lower numbers of skeletal remains from Amoreira when compared to the other two sites and in the dispersion of the material in different institutions. This means that the history of excavation of Amoreira (see below), was relevant in delaying their study. Moreover, the poor state of preservation might have contributed to discourage anthropological analysis.

Within a research project on the Mesolithic-Neolithic transition, we have systematized all the human remains from the two main Portuguese Mesolithic sites, namely the shell middens from Muge and Sado (Cunha and Umbelino, 1997 ; Cunha *et al*., in press a, b, c). The osteological material from Muge is dispersed by three different museums located in the following cities: Porto, Lisbon and Coimbra (Cunha and Cardoso, in press). In addition, a fire, which occurred in 1974 at the Museum of Oporto, led to both mixing and loss of the skeletons. Since some of the material lacked labels, some radiocarbon dates were performed in order to demonstrate their Mesolithic provenance (Cunha and Cardoso, 2002). The human bones retrieved at Amoreira were analised in this context.

THE SHELL MIDDEN OF CABEÇO DA AMOREIRA

The shell midden of Cabeço da Amoreira is located on the left bank of the Muge river, some 5 km from its confluence with the Tagus river, being its level at the basis, around 20 m from the sea level (Arnaud, 1987). When discovered, the shell midden formed an ellipse 90 m long on its N-S axis and 0.50 m wide on the E-W axis approximately (Newell *et al.*, 1979). The maximum height of the deposits was 3.25 m (Roche, 1964-1965) while its maximum surface was around 14 000 m^2 (Roche, 1951).

In 1882 Paula and Oliveira (1882) carried out the first excavations in Amoreira. Half a century after, from 1930-1933, Serpa Pinto, Santos Junior and A. Ataíde, worked

again on the site. Between 1959 and 1967 A.J. Roche and O. da Veiga Ferreira conducted the final rescue excavations of that part of the site, which had not been destroyed or disturbed (Roche and Ferreira, 1967). Yet, there is a substantial portion still in place, which lead to the development of new fine-grained excavations. The new campaigns started in 2000 are currently being conducted (Rolão *et al.,* n.d.).

From the first two campaigns 11 or 12 graves were excavated. To date, their Mesolithic context has not been demonstrated. Over their 8 seasons of excavations, Roche and Vega Ferreira recovered 17 graves, with a well defined Mesolithic context, all associated with layers containing Mesolithic lithic industry. According to Roche (1964-1965), the deceased were buried on their backs in contracted and partially extended positions. Though more than a century from the first and almost half a century has passed from the second excavations, no information was available about the skeletal remains recovered from these circa 29 graves until now [2].

To ascertain their Mesolithic provenance, radiocarbon dates were performed at the Beta Analytic Inc., in Miami, in 1999. Since the most doubtful set was the one deposited in Oporto, two radiocarbon dates were taken. The results were unambiguous and instructive. While, on one hand, the Mesolithic provenance was established, on the other, an assemblage of human bones stored in Oporto and labelled as Mesolithic with unknown specific provenance, was excluded on the basis of the radiocarbon dates.

It consists of a set of 23 individuals (MNI based on the counts of the left humerus) which revealed to belong to the Iron Ages (3290 30 BP-Beta), thus, reaffirming that chronological context was a crucial step in this analysis. The choice of the material to be dated was based on the general appearance of the human bones. Whilst the bones, which proved to be Mesolithic, were characterized by a typical "Mesolithic look", that is, with a layer of calcite around the surface and keeping an identification label, the set of bones excluded lacked both that appearance and labelling, the reason why they were subjected to dating in the first place.

The obtained radiocarbon dates are 6850 ± 40 BP (C^{13}/C^{12} = -16.500/00; probability: 95%) as far as we know, the only ones available for Amoreira on the basis of human bones. The bone dated belonged to skeleton 7 (Beta-127450).

The occupation of the three Mesolithic sites was approximately simultaneous, although Amoreira, in comparison with the other two sites M. do Sebastião and Arruda, seems to be somewhat more recent (about 200 years). Nevertheless, it seems that all the sites were utilized over a long time, at least 800 years.

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2 . The osteological material recovered by Roche and Veiga Ferreira is deposited in the Museu dos Serviços Geológicos (Lisbon), while the one from earlier campaigns is in the Museu de História Natural of Porto.

THE OSTEOLOGICAL SERIES OF AMOREIRA

The series comprises skeletal remains of at least 21 individuals. To the quantification of the total number of individuals represented by the human bones, we have respected the labels in direct association with the remains, since none of the skeletons from Amoreira stored at Oporto once excluded the set of bones with other chronological provenance lacked identification on an original paper sheet. On some of those labels besides the number of the skeleton, the layer of provenance and the year of excavation were stated. The material housed in Lisbon lacked the original labelling but kept the museum reference marked on the bones.

Fifteen of the skeletons are deposited at the Oporto Museum, while six are at the Museu dos Serviços Geológicos in Lisbon. This seems to mean that the osteological material from the first excavations was stored better than the latter one, since from the 17 graves dug by Roche only 6 individuals were recovered. What happened then to the human remains dug by Roche? As we have previously noted (Cunha and Cardoso, in press), while in Oporto, we recorded some osteological material represented by parts of skeletons preserved as blocks that were doubtless from Muge but without any label, in Lisbon there was no material with unknown provenance. It is quite improbable, therefore, that some more material from Amoreira will be found in Lisbon, which means that some material recovered by Roche at Amoreira is lost forever. Concerning the material housed in Oporto, unfortunately, the chances to demonstrate its exact origin are very vague.

STATE OF PRESERVATION

Since all the material is from the site of Amoreira, the material was analysed as a single series, and that from now on, the data presented refer to the assemblage as a whole (Lisbon + Porto material).

Only 3 out of the 21 individuals are well preserved. The remaining ones are either incomplete or very incomplete. Whilst very few bones were absolutely free of any kind of taphonomic alterations, the majority is encrusted in calcite, which precluded the analysis of some anthropological features. Yet, this is also characteristic for the skeletal remains from Moita and Arruda, which are almost always, encrusted with a densely cemented matrix. Therefore, the major problem of Amoreira's series regards its state of preservation. While the material needed to be cleaned in order to remove the calcite from the bones (*fig. 1*), previous attempts, besides proven inadequate have caused some damage to the material. Acetic acid seems to be efficient in removing the calcite, however, as secondary consequences are not fully known, we opted to study the material as it was.

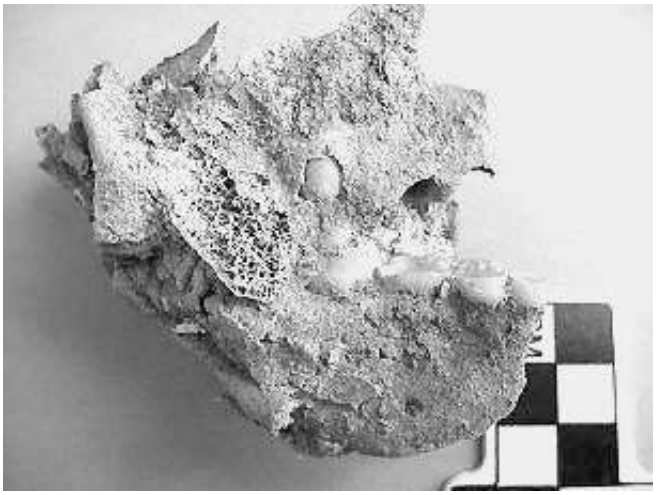

Fig. 1 - Example of the state of preservation of some of the skeletal remains. Skeleton 9/A, [7 years ± 24 months (after Ubelaker, 1989)].

DEMOGRAPHIC PROFILE OF AMOREIRA'S SAMPLE

The series is made up of 8 (around 38%) non-adults (less than 20 years) and 13 (about 62%) adults.

Among the 8 non-adults, 5 died at less than 5 years of age (or at the age of 5), 2 during the second infancy (6-12), whereas for the remaining one it was impossible to propose any age estimation. Teeth calcification and eruption (Ubelaker, 1989) allowed the age estimation for five individuals (*tabl. 1*).

Skeleton number	Age at death
Skeleton 9 / A	7 y ± 24 months
Skeleton 80.2/3 (80.49 – 80.46)	7 y ± 24 months
Skeleton C. Amoreira/1930 (our reference 404)	5 y ± 16 months
Skeleton 80.2/3 (80.50-80.52)	5 y ± 16 months
Skeleton 80.2/3 (80.45-80.46)	4 y ± 12 months

Tabl. 1 - Age at death for non-adults based on teeth calcification and eruption.

The fragmentation of the remains limited the analysis. Nevertheless, the two youngest individuals (included in the age-group ≤ 5) were detected by means of diaphysis lengths. A tibia diaphysis length (Scheuer and Black, 2000) allowed the detection of the youngest individual of the sample: a newborn. Fragmented radius and

ulna represented another very young baby. Their maximum estimated length pointed to another new born. In sum in accordance with the other two sites, Amoreira also has neonatal and very young infants.

For the adults, only for 5 out of 13, it was possible to infer their age group at death. This was done on the basis of a set of observations, namely dental wear (1st *versus* 2nd *versus* 3rd molars), signs of osteoarthritis, alterations on the pubic symphysis and auricular surface (Buikstra and Ubelaker, 1994). The most relevant results concern the detection of two individuals clearly older than 50 years. The other three remained in the group 31-50 years. The range of the age groups is deliberately large, reflecting the state of preservation of the skeletal remains. The bad state of preservation of the skeletal remains seriously limited the sex diagnosis, since for 53% of the adult sample (N = 13), it was impossible to attain any results. The six individuals, for which sex determination was possible, were equally distributed by the two sexes. In view of the limited number of individuals and limited data, no demographic extrapolation was deemed reasonable.

MORPHOLOGICAL ASPECTS

The stature (Olivier *et al*., 1978) was calculated only in two cases for which the sex determination was possible, both of them males. Based on the radius maximum length (in one individual) the stature was estimated at 155-161 cm, and on the humerus maximum length for the individual 408 (our reference) at 153-159 cm. For three other individuals, of unknown sex, three estimates were always below 160 cm.

Compared with other shell middens from Muge and Sado, people from Amoreira seem to be slightly smaller. In effect, Jackes and Lubell (1995) reported a median male stature of 1,60 cm for Arruda and Moita, while Cunha and Umbelino (2001) found a corresponding value of 161 cm for Sado. The different methods or bones used, could easily explain the differences found. Thus the values obtained are in general agreement with the others found for the other coeval Portuguese sites.

Upper limb robustness was evaluated for four individuals, and all of them (two males and two undetermined) were found to be robust (Olivier and Demoulin, 1990).

Since biomechanics, evaluated by means of femoral and tibial forms, is an anthropological area of increasing interest in recent times (Larsen, 1997), we have tried to verify whether there were considerable differences among people of Amoreira, Moita and Arruda. Flattening of the tibia and femora were evaluated by means of the cnemic index and platymeric index, respectively (Olivier and Demoulin, 1990). Unfortunately it was possible only for a limited number of tibias and femora (4 tibias and 3 femora). The results are, however, interesting since all three analysed individuals had platymeric

femurs, while of the four individuals for which the flattening of the tibia was quantified, two had flattened tibias whereas the other two were mesocnemic.

Jackes and Lubell (1999) have found very considerable differences between Arruda and Moita in this respect, reflecting different bending and torsional stresses. Those differences, still according to Jackes and Lubell (1999), suggest that the Arruda people had different activities from those from Moita. What happens then with the people from Amoreira? Moreover, what kind of information concerning the type and pattern of activity could be inferred for these semi-mobiles hunter-gathers? Unfortunately no pilastric index was obtained for Amoreira sample, which precludes a series of comparisons. When comparing cnemic index, taken at the nutrient foramen at the tibia, the mean value for Amoreira is 63.8 (N = 4), while the Moita mean is 65.55 (N = 23) and Arruda is 63 (N = 30). Obviously the different sample sizes conditioned the comparisons, nevertheless it seems that the people of Amoreira is within the variation observed for the two other sites. According to Jackes and Lubell (1999: 30) "the Arruda females were engaged in some activity which put particular pressure on their tibiae". Even though our sample does not allow sex discrimination, it is probable that people from Amoreira were also engaged in activities that put some stress on their lower limbs.

PATHOLOGY

Oral Pathologies

Caries rate can provide an important indication of the diet. Analyses of Portuguese Mesolithic dental pathology show that it is difficult to identify the "real caries rate" (Jackes and Lubel, 1995). Obviously, the state of preservation and the degree of cleaning (or lack of it), seriously conditioned caries evaluation. Among the twelve individuals with dental fragments (only two individuals preserved the two maxillas, while four had fragments of the upper maxillae and six preserved pieces of the lower one), only one, skeleton 8, a female older than 50 years, presented cariogenic lesions, namely two interproximal caries. Thus, caries rate by individual is 8.3% (1/12), which can be considered a low value. When considering only adults, this value is a little higher due to the smaller sample size : 14.3% (1/7). However, there are three out of seven adult individuals with ante-mortem tooth loss and still two individuals presenting abscesses (sk 8 and sk 10 (older than 50 years) and there is clearly the possibility that caries rate is underestimated. Consumption of sticky fruits such as figs, is a plausible explanation of the lesions found (Jackes and Lubell 1995; Lubell *et al.,* 1994). Furthermore, it is clear that dental pathology is age dependent since the non-adults were free of caries and the older individuals were significantly more affected by oral pathologies. Concerning diet, some rough items were eaten.

The use of anterior teeth as tools is well known for the Portuguese Mesolithic and Neolithic (as noted by Jackes and Lubell, 1995; Silva, 2002; Cunha and Umbelino, 2001), and it was deemed important to verify the pattern of dental wear for the individuals from Amoreira. Once again, the individuals of Amoreira do not differ from the pattern found for the other Mesolithic Portuguese people (Cunha and Umbelino, 2001; Jackes and Lubell, 1995) the anterior teeth are significantly more worn than the posterior. Moreover, in older individuals, where the posterior teeth were lost, the anterior ones were worn in a horizontal pattern (*fig. 2*).

Fig. 2 - Type and pattern of dental wear in Amoreira (Skeleton number 6).

Once again, skeleton 8 can be signalled out for its strong dental wear, despite which, some caries was still perceptible. Nevertheless, it is plausible that high attrition both reduced the potential for occlusal caries and disguised ancient lesions.

In younger adults, the third molars were much less worn than the first ones, while early adolescents display quite marked wear on the deciduous upper molar (*fig. 3*).

Fig. 3 - Dental wear in a non-adult from Amoreira [Skeleton 9/A-7 years ± 24 months (Ubelaker, 1989), fragment from the upper maxilla].

Other Pathologies

Comparable to other Portuguese Mesolithic people, Amoreira is characterised by a low incidence of pathologies. There is one case of a traumatic injury in a distal portion of a radius in a male individual (31-50 years at the time of death) (Cunha *et al*.). Fracture line was detected in x-ray analysis. Furthermore, there is a hemi-sacralized vertebra with congenital aetiology in an adult individual.

FINAL REMARKS

When we compare the total number of individuals retrieved in each of the three sites of Muge, it becomes obvious that Amoreira is the one with the lower number of individuals (Arruda = 97, Moita = 79, Amoreira = 22) (Jackes, 1988). Why that? Until other witness is available, the three Muge middens seem to be base-camps, year-round habitation (Lentacker, 1991 *in* Lubell *et al.,* 1994). The presence of neonates, children, young and old adults is consistent with a long-term living sites, and we can exclude the hypothesis that Amoreira was a satellite camp. The most reasonable explanation for the unequal number of individuals might be the area excavated. In other words, though it might be real that Amoreira was a smaller base camp, much is to be expected from the new excavations at Amoreira recently started which are given more important skeletal material (Rolão *et al.*, n.d.).

Although heterogeneity is a common feature of the physical anthropology of Muge communities, based on the limited data available so far, Amoreira can be included in the same cluster as Arruda and Moita.

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